N. A. Wood.

THE CONDOR

A Magazine of Western Ornithology

Volume XXXVII November-December, 1935 Number 6

COOPER ORNITHOLOGICAL CLUB

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A Magazine of Western Ornithology

Published Bi-monthly by the Cooper Ornithological Club

Entered as second-class matter May 15, 1925, at the post-office at Berkeley, California, under Act of Congress of February 28, 1925, Section 412, paragraph 4.

Issued from the Office of THE CONDOR, Museum of Vertebrate Zoology, Berkeley, California.

SUBSCRIPTION RATES

Three Dollars per Year in the United States, payable in advance.
Fifty Cents the single copy.
Three Dollars and Twenty-five Cents per Year in all other countries in the International Postal Union.

COOPER ORNITHOLOGICAL CLUB

Dues are payable in advance on January first for the calendar year: Three Dollars per year for members residing in the United States; Three Dollars and Twenty-five Cents in all other countries. Members whose dues are paid receive THE CONDOR without additional charge.

The Life Membership fee is Seventy-five Dollars. No additional dues are required, and the money is invested and the interest only is used for Club publications. Life Members receive The Condor without additional charge.

Send manuscripts for publication to the Editor, J. GRINNELL, Museum of Vertebrate Zoology, Berkeley, California, or to either of the Associate Editors, JEAN M. LINSDALE and ALDEN H. MILLER, same address.

Send dues and subscriptions to JOHN McB. ROBERTSON, Associate Business Manager, Buena Park, California; orders for back numbers of THE CONDOR and the PACIFIC COAST AVIFAUNA series to W. LEE CHAMBERS, Business Manager, 2068 Escarpa Drive, Eagle Rock, California

Issued November 15, 1935

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A Bi-monthly Magazine of
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VOLUME XXXVII | NOVEMBER-DECEMBER, 1935 | NUMBER 6

NESTING OF THE BLACK SWIFT IN SEQUOIA NATIONAL PARK

By JOSEPH S. DIXON

WITH TWO ILLUSTRATIONS

On August 7, 1933, the writer and Walter Powell, acting park naturalist, discovered what appears to be the first recorded nest of the Black Swift (*Nephoecetes niger borealis*) for the southern Sierra Nevada. We found three nests, but there probably were others in the vicinity, since over a dozen Black Swifts were seen. The three nests were located within a linear distance of twenty feet, so that the species might reasonably be said to have colonial nesting habits, at least in this instance. The nest site was located in the deep granite gorge of the Marble Fork of the Kaweah River. All three nests were located in a shallow cave that had been formed by the falling of a section of the cliff, leaving a broad arch about thirty feet in height (see fig. 49). The bare, wet, dark granite wall rose precipitously above a deep pool beside a waterfall, spray from which kept the entire surroundings drenched with mist.

In all three instances the swift nests were made of green resurrection moss, pressed down but not stuck together with saliva, and were placed on and supported by a clump of fragile five-fingered ferns. The first nest was a firm, mossy cup placed about eighteen feet above the water. This nest measured outside 3 by 4 inches in diameter and was 3 inches high. The trampled-down shallow cup was empty, and the young bird evidently had just left the nest.

The second nest, also, was placed on and supported by a clump of ferns. This nest measured 3 by 5 inches in diameter, but was only 2 inches high, having been trampled down by a fledgling Black Swift that was still covered with dark, slaty natal down, through which protruded the primaries and tail feathers. Distinct feather tracts were noted on the bird's forehead and in the region of the wing coverts, where many light-gray feathers were coming in.

The canyon was so deep and dark and the light was so dim that at a distance of twenty-five feet I was unable to make out the outline of an adult swift that came hurtling in. Instead of flying directly to the nest, she flattened herself against the wet granite wall, where she clung easily by her strong, sharp claws while she drank thirstily from the seepage water that trickled down the face of the wet rock. An hour later a second female returned and clung to the face of the rock about eighteen inches to one side of the nest but, seeing me, flew downstream. At

9:35 she returned and clung beside the nest as before. At 9:42 the female swift, using both wings and claws, fluttered bat-like over to the nest, where she fed the young swift by opening her broad bill and disgorging directly into the youngster's mouth. After brooding the young swift until 9:50, the mother left, returning at 10:35 to drink and to brood the young bird for another five minutes.

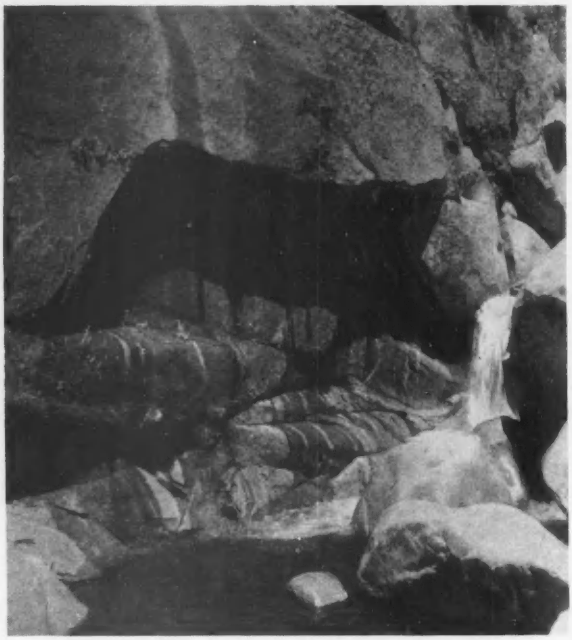

Fig. 49. Nest site of Black Swift in granite gorge of Marble Fork, Kaweah River, Sequoia National Park. Three nests were placed close together in shaded area near center, at left of waterfall.

Wildlife Division negative no. 3178

The outstanding feature of the young swift was his aversion to light. He always turned around in the nest so as to face the darkest corner. Another feature was the ease and tenacity with which he clung to the nest with his sharp, strongly-curved claws. When placed against a vertical granite cliff, he had no trouble clinging by one foot, but tucked his head down to avoid the bright light (see fig. 50).

To authenticate the record, the young swift and nest were taken back to camp. They stood the journey well, but the swift was found dead in its nest the next morning. Its stomach was entirely empty, but the bird was exceedingly fat. It weighed 39 grams, almost as much as an adult female, which weighed 44 grams.

The stomach contents of the adult female Black Swift contained nothing but 2 cubic centimeters of turf-building ants, one of the phases of *Formica rufa*. The question arose as to how a bird never known to light on the ground or even to perch on a tree could capture nearly 100 ants. Examination showed that these were

winged adult ants probably taken during a nuptial flight. According to Wheeler's ant book, in 1880 the national forests of Germany imposed a fine of 100 marks or one month in jail on anyone convicted of destroying the nest or eggs of this ant, because it had been found to destroy so many nests of injurious forest insects.

Fig. 50. Downy young of Black Swift clinging by one foot to sheer granite cliff, with head (top left) tucked down to avoid light. Note incoming gray-edged primaries and wing coverts. Photograph taken August 7, 1933; two-thirds natural size.
Wildlife Division negative no. 3466

On July 3, 1934, at 8:30 a. m., I visited the swift nest colony and found two female swifts on the nests used the previous year. The first nest was in the same condition that I had found it in, in August, 1933, after the young swift had left it. The dead pine needle was still in place in the bottom of the nest, which had not been rebuilt. The nest contained one recently-hatched chick, bluish black in color. Its eyes were closed, and there was not a bit of natal down on its body. The other nest contained one long, creamy-white egg, which was slightly incubated.

The first female flew off the nest when I approached within twenty feet of her, but she came back in three minutes and tried to return to her nest. Thirty minutes later she came back again and perched for eight minutes, clinging to a vertical ledge near her nest. Then, by using both wings and feet, she awkwardly crawled over to her nest and brooded the young swift.

Because of the heavy snowfall in the mountains, and the resulting high water, it is doubtful if we will be able to gain access to the Black Swift nests this year.

Wildlife Division, National Park Service, Berkeley, California, May 20, 1935.

AN ECOLOGICAL STUDY OF SOME MINNESOTA MARSH HAWKS

By W. J. BRECKENRIDGE

WITH THREE ILLUSTRATIONS

Of that much discussed group, the hawks and owls, the Marsh Hawk has probably drawn more debate over its right to live than any other single species. With the hope of casting more light on this question, the writer, during the spring and summer of 1932 and 1933, made a special study of the Marsh Hawks (*Circus hudsonius*) which nested on a single square mile in east central Minnesota.

Considerable data regarding the prey taken by Marsh Hawks have been published but information concerning the environment from which this prey was taken is largely lacking. In this study the vertebrate life of the area in which the hawks were living was studied in detail at the same time that the data regarding their food were being gathered, in order to learn just what choice the hawks were exercising in securing their prey.

While collecting this material relative to their food, the writer recorded many observations regarding the life history of these hawks, and particularly he became interested in the social organization of the families. In fact his intimate observations of many of the peculiar and really remarkable habits of this bird have made it a real character for him. The knowledge of these habits has come to take rank in the writer's estimation, along with its positive economic value, as a strong argument favoring its protection. If only shooters could get to know in a similar way the birds they are condemning, how often it might swing the balance in the birds' favor!

THE VERTEBRATE LIFE OF THE AREA

The square mile to which the present study was restricted lay in the center of an extensive area of very slightly rolling, sandy country just north of Minneapolis in Minnesota. A scattered stand of timber, composed largely of oaks, occupied the higher parts of the tract while the lower portions had been sedge swamps some years ago, but drainage had changed them into damp peat meadows of bluegrass. An irregular intervening belt was covered by willow and dogwood brush. About a quarter of the area was under a neglected type of cultivation.

A brief statement regarding the vertebrate life present on this area will give the reader a definite picture of that part of the biotic environment which was exposed to the predations of these particular hawks.

Amphibians and reptiles were not abundant. Of the following species recorded, only the common toad, leopard frog, and garter snake could be classed as common.

Tiger Salamander. *Ambystoma tigrinum.*
Common Toad. *Bufo americanus.*
Swamp Tree Frog. *Pseudacris nigrita triseriata.*
Wood Frog. *Rana cantabrigensis.*
Leopard Frog. *Rana pipiens.*
Black-banded Skink. *Eumeces septentrionalis.*
Garter Snake. *Thamnophis sirtalis sirtalis.*
Blue Racer Snake. *Coluber constrictor flaviventris.*
Blanding Turtle. *Emys blandingi.*
Bell Turtle. *Chrysemys belli belli.*

The Marsh Hawk has been accused of preying extensively on birds, so particularly thorough study of these was made. One hundred species were encountered

on the tract, and of these, sixty-seven were found to nest. A census method was devised (Wilson Bull., 47, 1935, pp. 195-197), by which a total avian population of about 2000 birds was arrived at, or three plus birds per acre. Naturally in these surroundings small passerine birds were predominant in numbers. The following fifteen species, given in the approximate order of their abundance, were found to be the most common:

Clay-colored Sparrow. *Spizella pallida.*
Song Sparrow. *Melospiza melodia melodia.*
Yellow Warbler. *Dendroica aestiva aestiva.*
Catbird. *Dumetella carolinensis.*
Northern Yellow-throat. *Geothlypis trichas brachidactyla.*
Cowbird. *Molothrus ater ater.*
Goldfinch. *Spinus tristis tristis.*
Red-winged Blackbird. *Agelaius phoeniceus arctolegus.*
Brewer Blackbird. *Euphagus cyanocephalus.*
Eastern Kingbird. *Tyrannus tyrannus.*
Alder Flycatcher. *Empidonax trailli trailli.*
Mourning Dove. *Zenaidura macroura marginella.*
Brown Thrasher. *Toxostoma rufum.*
Vesper Sparrow. *Pooecetes gramineus gramineus.*
Warbling Vireo. *Vireo gilvus gilvus.*

Those predacious birds that competed for food with the Marsh Hawk were:

American Bittern. *Botaurus lentiginosus.* One or two pairs.
Red-tailed Hawk. *Buteo borealis borealis.* Two pairs near the area.
Sparrow Hawk. *Falco sparverius sparverius.* Three or four pairs.
Screech Owl. *Otus asio naevius.* One or two pairs.
Great Horned Owl. *Bubo virginianus virginianus.* One pair.
Crow. *Corvus brachyrhynchos brachyrhynchos.* Two pairs.

The approximate numbers of game birds present were:

Ruffed Grouse. *Bonasa umbellus umbellus.* Ten to fifteen.
Prairie Chicken. *Tympanuchus cupido americanus.* Ten to fifteen.
Bob-white. *Colinus virginianus virginianus.* Fifteen to twenty.
Ring-necked Pheasant. *Phasianus colchius torquatus.* Ten to twelve.
Killdeer. *Oxyechus vociferus vociferus.* Four to six.
Upland Plover. *Bartramia longicauda.* Six to eight.
Mourning Dove. *Zenaidura macroura marginella.* Forty to fifty.

Numerous farms within one mile of the area were supporting about 2000 domestic poultry.

Twenty-four species of mammals were found to occur on the tract. No population counts of these were attempted but all of the following could be classed as common to abundant:

Meadow Mouse. *Microtus pennsylvanicus pennsylvanicus.*
Northern White-footed Mouse. *Peromyscus leucopus noveboracensis.*
Loring Red-backed Mouse. *Clethrionomys gapperi loringi.*
Striped Ground Squirrel. *Citellus tridecemlineatus tridecemlineatus.*
Cottontail Rabbit. *Sylvilagus floridanus mearnsi.*

Several mammals present which were food competitors of the Marsh Hawk were:

Mink. *Mustela vison letifera.* Occasional.
Short-tailed Weasel. *Mustela cicognani cicognani.* Occasional.
Long-tailed Shrew. *Sorex cinereus cinereus.* Common.

Short-tailed Shrew. *Blarina brevicauda brevicauda.* Common.
Striped Skunk. *Mephitis mephitis.* Occasional.

NOTES ON THE LIFE HISTORY OF THE MARSH HAWK

Soon after the arrival of the Marsh Hawks in March, certain of these birds were often seen performing their spectacular courting dives. In doing this the bird, in a very evident state of excitement, dived from a height of perhaps a hundred feet at a very steep angle for about fifty feet, when it "zoomed" up again to about its original height where it turned over *sidewise,* like the wings of a wingnut being turned onto a bolt. The aviator refers to this as a "barrel roll." This is often incorrectly described as a somersault. In this inverted position the bird beat its wings two or three times, then righted itself by the same sidewise turn, and again dived into the great dip to repeat the performance again and again. Brown birds have been seen performing in the above manner and these have usually been considered as second year males. The writer feels fairly sure, however, that females also engage in these actions although less frequently than do the males. The females of the closely related Hen Harrier of Europe have been recorded as performing like the males but with much less spirit.

Nest building activities usually began late in April and early May. During the first year's work on this tract, six nests of this hawk were built on or very near it, while the second year, four nests were built within its limits. Two families were successfully reared in 1932 and three in 1933. Nests were usually situated a quarter of a mile or more apart, but in 1933 two families were reared within two hundred yards of each other with apparently very little antagonism.

Evidence was found to indicate that these ground nesting hawks, like many of the tree and ledge nesting species, tend to nest in the same general locations, if not on identical nest sites, on successive years. Ground cover is subject to more rapid change due to fires and cultivation than are trees and ledges, so probably this tendency is fully as strong in the Marsh Hawk as in the other species; but changes in the environmental conditions often prevent repeated nestings on the same site.

The incubation period for the eggs of this hawk has been variously stated as being from twenty-one to thirty-one days. The writer in two instances had the opportunity to determine this period. It proved to be thirty-two days in one case and thirty to thirty-one in the other.

During this study brooding females were flushed from nests with eggs more than seventy-five times, while not once was a male found brooding eggs. This strongly indicated that the males took no part in the incubation of the eggs.

The smaller nestling hawks often fail to survive due to their inability to secure food in competition with the larger nestlings. This variation in size and the resulting mortality is usually explained by the fact that the young hatch on succeeding days. Early in life, female hawks exhibit larger size and heavier bones, especially in the legs and feet, than do the males. This difference in growth rate as well as the difference in age probably has an important bearing on whether or not all of the young will have opportunity to develop. For instance in a case where, of six young, the first four to hatch are males and the last two, females, these last two will have an inherent vigor and ability to grow faster than the older males and will have a fair chance of survival. Whereas, if the first hatched are females and the last, males, the difference will only be accentuated by the females' tendency toward greater growth and the males will have little chance of survival.

The female was never seen to favor the smaller nestlings in feeding and this

treatment resulted in the death of several of them. The female was observed on one occasion to actually pick up a dead nestling, dismember it, and feed it to the remaining young.

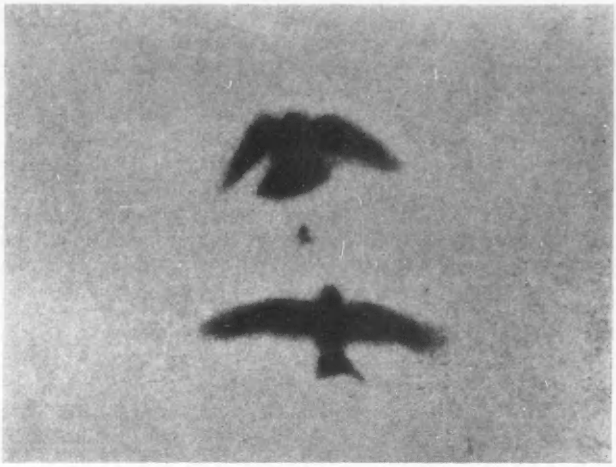

Fig. 51. Male Marsh Hawk dropping prey to female.
From motion picture film.

The spectacular transfer of prey from the male Marsh Hawk to the female in mid-air (fig. 51) has been described by a number of writers. This was found to be a not unusual occurrence and was, in fact, the normal method of passing prey captured by the male to the female. This exchange took place sometimes as frequently as fifteen to twenty times a day between the birds of a single pair. It is not surprising that this exchange should occur so often when it is known that the male captures about eighty per cent of the prey for the young during their period of greatest growth. During twenty-eight and one-half hours spent observing at least two different nests, the writer found that the females captured prey eight times, while during the same period the males brought in prey forty-three times. Forty-two of the catches made by the males were transferred to the females near the nests.

Not only were the males never found to brood the eggs but also they were never observed to brood or feed the young. One hundred and sixty hours were spent by the writer in careful observations at three different nests and during that time the males appeared at the nests but eight times while the females came in one hundred and forty-six times. The visits of the males were found to be really "forced landings" wherein they alighted with prey when the females were not present to receive it. This situation was apparent from the fact that the male birds regularly circled the nests, calling for the females for some minutes before alighting, then when they did appear at the nests, they dropped in, released their talons from the prey, and literally bounced back out of the nests with the very evident attitude of an intruder. And as to attending the young, the males appeared not even to be aware of their presence, not to mention feeding them.

From well over one hundred and eighty hours of close observation during these two seasons, the writer concluded that the function of the male Marsh Hawks

during that period when the young were being fed was that of hunting for food and that they guarded the nests only at those times when the females were feeding the young or during the few short periods when the females were away hunting. The duties of the females consisted largely of guarding the nests and feeding to the nestlings the food brought in by the males.

These duties seemed to be well recognized by the birds themselves. The male on returning from a hunt normally dropped his prey to the female and sailed over to a favorite lookout perch from which he watched until the female had finished feeding the young. He then went hunting again while she went on guard on certain chosen perches in the vicinity of the nest. Occasionally the male appeared to linger too long, whereupon the female, becoming impatient, swooped threateningly at him driving him off to his hunting again.

Considerable information regarding the hunting ranges of two pairs of hawks was secured. In both cases the birds leaving the nests seemed to follow one of three fairly definite loops out over the surrounding country. The extent of the loops was determined approximately and plotted on a map. In each case the territory covered by the hunting birds amounted to about one square mile. At several points the ranges of these two pairs overlapped slightly and a bird from one pair was observed on several occasions hunting side by side with one from the neighboring pair with no signs of antagonism. Evidently their territorial rights were not very firmly established at the periphery of their ranges. Undoubtedly weather conditions, abundance of food animals, and other factors would cause considerable daily and seasonal fluctuations in the extent of these hunting ranges.

The fledgling hawks learned to fly during their fifth week. Little hunting, even for insects, was attempted at first, but greatly reduced rations from the adults soon forced them to look for beetles and grasshoppers in the tall grass. They developed skill at flying very rapidly and when between seven and eight weeks of age they were observed catching prey from their parents in mid-air after the manner of the adults. The young birds spent the nights in the vicinity of the nests until about eight weeks old, when the families seemed to break up and the young started out for themselves.

FOOD OF THE MARSH HAWK

Data regarding the prey taken by the Marsh Hawks on this particular section during the two seasons were secured chiefly from three families and by three methods, namely: direct observation from blinds; examination of pellet contents; and examination of gullet contents of nestlings. Pellet determinations were made by the United States Biological Survey. The following is a complete list of the identified prey taken:

Mammals
- Cottontail Rabbit. *Sylvilagus floridanus mearnsi.* Juvenile.
- Striped Ground Squirrel. *Citellus tridecemlineatus tridecemlineatus.*
- Meadow Mouse. *Microtus pennsylvanicus pennsylvanicus.*
- Red-backed Mouse. *Clethrionomys g. loringi.*
- Jumping Mouse. *Zapus h. campestris.*
- White-footed Mouse. *Peromyscus l. noveboracensis.*
- Eastern Chipmunk. *Tamias s. griseus.*
- Pocket Gopher. *Geomys bursarius.*

Birds
- Ring-necked Pheasant. *Phasianus c. torquatus.* Juvenile.
- Domestic poultry. *Gallus domesticus.* Juvenile.
- Bob-white. *Colinus v. virginianus.*

Marsh Hawk. *Circus hudsonius.* Juvenile.
Northern Flicker. *Colaptes a. luteus.*
Mourning Dove. *Zenaidura m. marginella.*
Red-winged Blackbird. *Agelaius p. arctolegus.*
Meadowlark. *Sturnella m. magna* or *S. neglecta.*
Red-eyed Towhee. *Pipilo e. erythrophthalmus.*
Savannah Sparrow. *Passerculus s. savanna.*
Catbird. *Dumetella carolinensis.*
Willow Thrush. *Hylocichla f. salicicola.*
Bluebird. *Sialia sialis sialis.*

Reptiles
Blue Racer Snake. *Coluber constrictor flaviventris.*

Amphibians
Leopard Frog. *Rana pipiens.*

Insects
Grasshoppers. Acrididae.
Ground beetles. Carabidae.
Stink bugs. Pentatomidae.
Carrion beetles. Silphidae.
Gold bugs. Scarabidae.

Plants
Dogwood fruits. *Cornus.*
Blueberries. *Vaccinium.*
Raspberries. *Rubus.*

Many of the above items appeared only occasionally or very rarely. Young cottontail rabbits and striped ground squirrels bore the brunt of the predations of these hawks, constituting about 50 per cent of the bulk of the food. The chart in figure 52 shows the food of the family from which the most data were gathered. This represents the food both as to numbers and bulk.

The striped ground squirrel constituted the main source of food for these particular hawks. It was common on the area and its diurnal habits made it particularly vulnerable to the Marsh Hawk. Both adults and young were taken.

Cottontail rabbits of nearly adult size were recorded in the prey and ranked a close second to the ground squirrel as a staple food of the hawks. Both of these mammals have great reproductive potentialities and in a favorable environment must have many destructive forces at work against them to keep their populations within reasonable bounds. The Marsh Hawks, in preying upon these so extensively, are therefore playing an important role as a balancing factor for these highly unstable populations.

Passerine nestlings and fledglings took first rank numerically in the recorded foods but in bulk were much less important than were the two forms mentioned above. This area, having such a heavy passerine population, could, and very evidently did, withstand considerable predatory pressure from both the avian and mammalian predators listed previously. Little concern is registered by ornithologists over the ability of these forms to hold their own in anything like a favorable environment.

Mice of four species entered into the diet of these hawks but ranked below those species noted above as a food source. Population data for four consecutive years indicate that the meadow mouse, the most available mouse for this bird, was fairly abundant but was declining in numbers during these two seasons and continued to decline for two more years to a very low point in 1935. This gradual decrease instead of a rapid drop suggests that this was a direct result of drought conditions and not a part of their population cycle.

Data secured on the pheasants and poultry taken by these hawks support statements made by a number of ornithologists to the effect that individual hawks develop a chicken killing habit. In the food data gathered, five young pheasants

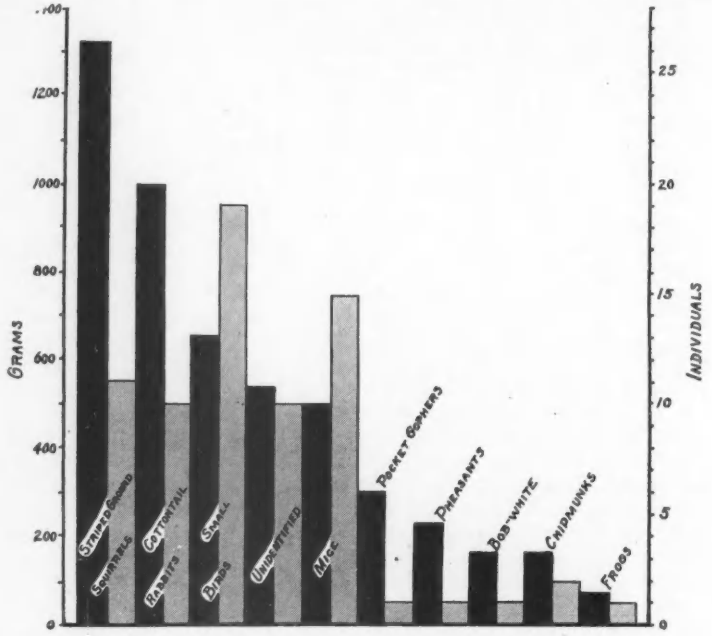

Fig. 52. Classification of prey of family no. 2, 1932, taken during five day period. Black bars represent weight in grams; shaded bars, numbers of individuals.

and several young chickens appeared. Three of the pheasants and all of the chickens were the prey of one pair. The other two pairs studied had each taken one very young pheasant and no poultry, although poultry was more accessible to them than to the first pair mentioned. It is noteworthy that all of the farmers in the vicinity seemed to recognize the effectiveness of guinea fowls and Purple Martins in protecting their poultry from hawks and that the only farmer reporting hawk damage had neither of these about his premises, while one or the other was present on all of the other farms.

One Bob-white was present in the diet of each of the three families studied most carefully. On this area the ground cover had been repeatedly burned and was too sparse to furnish proper protection for this bird from just such predators as the Marsh Hawk. In such marginal cover a few of these birds, both young and adults, could be expected to be taken. Protection from fires would, in a few years, greatly improve this cover and allow a much denser Bob-white population to exist safely.

Most of the remaining vertebrate prey listed was taken only rarely. These species, at the population levels existing at the time of this study, probably had little

to fear from the predations of the Marsh Hawk.

Insects, principally the larger Orthoptera and Coleoptera appeared occasionally in the pellets of the adults. None of these was ever recorded as brought to the nestlings, yet many appeared in the pellets of the young just learning to fly, indicating that the young took these themselves as their first prey.

Much plant material was swallowed accidentally by both adults and young. The appearance of the fleshy fruits of dogwood, blueberries and raspberries in the pellets of the young just learning to fly, strongly suggested, however, that these were taken intentionally by the birds during that period of scanty rations, perhaps being mistaken for animal food.

From the data presented, it appeared that the Marsh Hawks living under the conditions herein described, preyed upon nothing more formidable than three-fourths

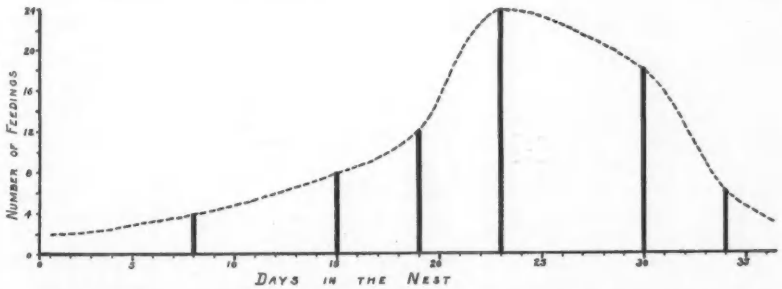

Fig. 53. Curve showing numbers of feedings for entire nest period. Dark vertical lines indicate observed feedings.

grown cottontail rabbits and adult pocket gophers. Adult cottontail rabbits, pheasants, prairie chickens, and domestic poultry were all available but were not recorded as taken while smaller prey was abundant. The Marsh Hawk may attack these forms at other seasons of the year while under pressure of hunger, but during its period of greatest consumption, the nesting period, it appears to limit its diet to the smaller, more prolific forms and to the young of the larger species.

In this study it was found that the daily rations of the young in the nest increased gradually up to about the twenty-fifth day of their lives when a marked reduction in these rations occurred, several days before the young began to fly (fig. 53). This curve of the reduced food consumed by the young corresponds well with the curve for the decrease in weight of young raptors near the end of the nest period recorded by Sumner (Condor, 31, 1929, pp. 85-111). This decrease in weight thus appears to result not only from possible physiological changes taking place in preparation for flight but also from an actual decrease in the amount of food consumed.

From this same chart (fig. 53), the total amount of food consumed by this particular family of young hawks (five hatching and three maturing) during their nest life may be roughly determined. Assuming the curve to represent their daily feeding throughout this period, the daily totals would amount to three hundred and eighty-eight feedings. The average of the sixty-three articles of prey brought to this family is about seventy-four grams. The total for the period then would be 28,712 grams, or about sixty-three pounds of food consumed by this family of nestling Marsh Hawks up to the time of their taking wing.

CONCLUSIONS

The following conclusions were derived from this study of the Marsh Hawks which nested on a single square mile in eastern Minnesota in 1932 and 1933.

1. The area on which these hawks lived was supporting an avian population of about three birds per acre. These were mainly small passerine birds, but Ring-necked Pheasants, Ruffed Grouse, Prairie Chickens, and Bob-whites were present with many domestic chickens available on near-by farms. Several species of mice, striped ground squirrels, and cottontail rabbits were the dominant mammals. Reptiles and amphibians were not abundant.

2. The male hawks did not assist the females in brooding the eggs.

3. Pairs of hawks were found nesting as near together as two hundred yards, with little evidence of friction, although they were normally separated by at least a quarter of a mile.

4. The hawks showed a strong tendency to nest on successive years in the same locations.

5. The period of incubation for the eggs of these hawks was from thirty to thirty-two days.

6. Female nestling hawks at an early age become larger and heavier than the males. It therefore seems probable that the distribution of the sexes among the young, as well as the variation in hatching time, is an important factor in determining whether or not the smaller young will survive.

7. The female hawks spent nearly all of their time either guarding the nest or feeding the nestlings. This latter duty was performed exclusively by the female.

8. The male hawks captured about eighty per cent of the food consumed by the nestlings during the greater part of their nest life. The males transfered nearly all of the prey they secured to the females in mid-air. On rare occasions males brought food to the nest, but left immediately without apparently noticing the young.

9. Each of the pairs of hawks studied hunted over an area of about one square mile. These hunting ranges overlapped in places, at which points the birds showed no resentment over the presence of the others.

10. The young began to fly at about five to six weeks of age and were sufficiently agile when only seven to eight weeks old to catch prey in mid-air which had been dropped to them by the adults. The young remained in the vicinity of the nest for about three weeks after learning to fly.

11. Thirty-one different forms of food including mammals, birds, reptiles, amphibians, insects, and fruits were recorded as taken for food by these hawks. Mammals comprised about three-fourths of the bulk of the food taken. Striped ground squirrels were the largest single item in their diet while young cottontail rabbits were almost equally as important. Small birds ranked highest in their diet in number of individuals, but constituted only a small portion of the bulk.

12. Two of the three families studied most closely gave no evidence of molesting poultry. The third pair was found to have taken a number of domestic chickens.

13. The one pair which preyed to some extent on poultry took at least three young pheasants while the other two pairs took one each.

14. One Bob-white was found in the food of each of these three families of hawks. One was an adult bird.

15. The daily amounts of food brought to the young decreased markedly toward the end of the nest life of the nestlings.

16. One family of young hawks was calculated to have consumed approximately sixty-three pounds of food up to the time of their taking wing.

Museum of Natural History and Department of Zoology, University of Minnesota, Minneapolis, Minnesota, August 3, 1935.

PARENTAL INSTINCTS IN BLACK PHOEBES

By ERIC CAMPBELL KINSEY

Desiring to obtain new specimens of the Black Phoebe (*Sayornis nigricans*) for use in the continuance of our studies on color changes and natural food substitutes in captive native birds, we set out in middle June of this year to cover certain nesting locations of this species situated in the Point Reyes district of Marin County, California.

It is almost impossible to trap the larger flycatchers, resident or migratory, other than during their nesting season, and as we do not wish to unnecessarily sacrifice life in the collection of our avian working material, it is our usual practice to trap only at nests containing fresh eggs.

Middle June is the normal time for fresh eggs of *Sayornis* in the district covered; however, for some reason, every nest this spring contained young instead of eggs at the time of our visit.

After two days field work in which all of the nesting sites then known to us were covered, it was decided to collect a certain pair of adults which had five young just on the point of leaving the nest. We had previously successfully hand-reared a nest of orphan Black Phoebes. But, knowing the burden of the constant attention and effort required to supply their wants in the nature of live insect food and not having the time available to repeat the experiment, we found ourselves in a quandary as to what disposition to make of the nestlings. We needed the adults, but we could not bring ourselves to the point of sacrificing their young.

After considerable thought and argument we decided to transfer the young to another nest situated approximately a half mile distant, which at the time contained newly hatched nestlings. The adult specimens were caught at the nest, their fully feathered young were netted and placed in a transfer cage. They were then taken to the other nesting location and carefully deposited in the nest, after the very young brood had been removed. The nest was watched through glasses from a distance of approximately seventy-five feet in order to ascertain whether or not the foster parents would accept the matured nestlings in place of their own newly-hatched ones.

After a period of about five minutes of fussing and obvious uncertainty on the part of both foster parents, we noticed the male go to the nest and feed one of the young. This appeared to be a good beginning and, as the female seemed to be greatly concerned over our presence in the immediate neighborhood, we withdrew a considerable distance and let nature take its course for the next twenty minutes. Then we again took our station near the nest and after further watching through our glasses saw both male and female feeding all the young. Eureka! What a relief. It was quite apparent that the problem of the older nestlings was successfully solved, but we still had the younger brood on our hands.

We puzzled over the new problem and again, after considerable thought and greater argument, we decided to make a further search to see if we could possibly find some new nest, containing only fresh eggs. We, therefore, started out for an entirely different location and at a distance of some fifteen miles finally found what we sought, a nest with fresh eggs under a stone culvert. The eggs were removed, the newly-hatched young from the second nest were placed in this third nest; and we stationed ourselves near-by, again to watch developments through our glasses. Once more there appeared to be some few minutes of puzzlement on the part of the

adult phoebes and again it was the male which first brought food to the young.

As it was then growing dusk it was necessary for us to leave for home in order to properly attend the first pair of adults now captive in our holding cage. It was decided, however, to return at daybreak the following morning to see that both groups of nestlings were being properly cared for by their foster parents, or to effect their rescue, if necessitated by desertion or some other cause.

Both sets of parents were feeding their respective broods when we arrived early next morning, which was most gratifying, also a considerable relief to our conscience which had been troubling us as the result of what my softer-hearted companion termed "our untimely meddling." After watching them for some time we began to speculate on how far the parental instincts of this species would carry. Query: If one set of parents would accept a brood of young some ten days older than their own and another set would accept newly hatched young in place of their own freshly laid eggs, might it not be interesting to make a general shift among a number of nests and watch the various parental reactions? We could always shift them back, if necessary, at least I so argued. Moreover our two experiments of the previous day along this line seemed to indicate that the risk involved would be small as compared with the scientific knowledge to be gained. It was decided to try the experiment forthwith, notwithstanding my companion's skepticism and admonishment to "let well enough alone."

As we were then at the site of the second nest, in new territory, a further search was made for additional nests with the result that a number were found containing broods of various ages and also one additional nest with slightly incubated eggs. We shifted young several days old into a nest containing young on the point of leaving. The latter brood was placed in the nest containing the eggs, the eggs were placed in the nest which formerly contained the young several days old. A watch was maintained, in turn, upon each nest with the following results. The partly grown young were accepted in lieu of the older group, the older group was accepted, after slight hesitation, by the adults with the eggs; however, the eggs were, so far as we could tell, never brooded by the pair from which the half grown young were taken. All of these nests were subsequently visited some three or four days later and all of the respective broods of young were being cared for by their foster parents just as though they were of their own hatching.

Due to the fact that we could not differentiate the male and female of the pair which received the fully feathered young in lieu of eggs we could not tell whether it was the male or female which first started feeding. In the case of the two shifts made the day before we feel sure that in each instance the male was the one which first accepted the new brood.

What conclusions may be drawn from the foregoing necessarily incomplete experiments are for the reader to decide. If the female of the pair to which the eggs were given in place of young had only brooded and hatched them we would feel safe in saying that any sort of shift could be made with impunity in this species. We will try this particular shift again next year. Possibly we will be lucky enough to strike upon a female with maternal instincts so strongly developed as to cause her to incubate and hatch the eggs which we will give her to replace her own brood of nestlings.

Manor, Marin County, California, July 19, 1935.

STUDIES IN AVIAN COLOR REACTION

By A. L. PICKENS

Would hummingbirds show apparent color preferences in a group of varicolored flowers of uniform shape and size? The question is a fair one, and yet not amenable to test under ordinary field conditions. Accordingly, six paper flowers colored red, orange, yellow, green, blue, and purple, each with a vial of sugared water and all of uniform shape and size, were placed out for the Ruby-throats (*Archilochus colubris*) along a small glen.

During observations extending over a week, 175 visits were recorded as follows: Purple, 49; red, 47; orange, 31; blue, 22; green, 16; yellow, 10. Purple, red and orange were at times called upon for extra long drinks, and purple, red, orange, and blue were frequently hovered above for intermittent sipping; the order given shows the order of color for long drinks, sipping visits and sips, and thus the order of color selection is not affected thereby. Note how each color is set off against its complement: purple highest, and yellow lowest; red second highest, and green second lowest; orange third highest and blue third lowest.

The experiment began with a very red orange, but was changed on the second day to a more yellow orange, and visits fell from 12 to 7, and drinks from 10 to 2. The initial very reddish purple was changed on the third day to a mere violet; here the drop was from an average of 20 visits and an average of 15 drinks a day to 6 visits and 5 drinks. Curiously, on the day the intensity of orange was lowered, green gained, while on the day purple was modified blue gained. The red-kin relation here is apparently working, yet the increase in green and greenkin is not now explainable.

It was possible at times to check fairly well on the visits of a single individual by placing the group of flowers near its favorite perch. The first bird to begin patronizing the flowers had claim on a small area of jewel-weed, badly invaded both above and below by neighbors. It quickly found the purple bottle-flower and drank, then rose and flew past all the others to the red. It drank long, and once or twice stretched out on a large *Polymnia* leaf in front of the red bottle, its beak inserted into the sugared water as if yielding wholly to appetite and abandoning flight. It was probably rather hungry as a result of its territory having been so trespassed on by neighbors.

The bottles were removed to a neighbor's territory. They hung in a row: purple, blue, green, yellow, orange, red. Purple was examined, it being on the end, but the examiner was chased off by a neighbor; this happened again. A third trip, and purple was thrice sipped from, and the next four colors in the row were examined. A fourth trip, purple was again thrice sipped from; blue was skipped; green, yellow, orange, each sipped in turn, and red at the opposite end was drawn on for an extended draught; orange was examined again and the bird flew away, to return repeatedly. Here purple seemed the favorite for drinking, red, orange, and blue following in order; but while yellow was sipped from twice and green but once, green had seven additional examining visits without sipping, and yellow but two such. Still there was a rough approximation of the same surprising setting off of color against complement as noted before.

The totals for several other birds gave an order of red, orange, with blue and purple tying, yellow visited least, and green not at all. A bird when flying from a distance to the group of colors, selected red most often before which to make

the first pause; purple was a close second; orange, with half as many initial pauses as red, was third, while green, blue, and yellow followed in order. A tendency to select red-kin rather than green-kin colors is plainly apparent; that the colors are set off against their complements or approximate complements is indicated; in what way, however, is not indicated.

In contrast with the visual quest for food of hummingbirds is the tactile quest of the ducks. How would the color reactions of the two compare? A first test, in which a domestic drake was fed from colored servers, proved unsatisfactory, as mere contrast seemed to figure largely. White on blue, and brown on yellow, both highly valued by letterers for contrast, got excellent attention. A second test with vari-colored papers of uniform size fluttering on strings to simulate insects got better results. One drake, who as a duckling had shown a fear of red and orange, was first tested. One of the avoided colors (orange) was omitted, the chief desire being to test the bird's association of red and purple. Would it, like the hummingbird, associate the two as they are on the pigment wheel, or place them far apart as red and violet occur on the spectrum band.

Of the 100 times that the duck struck at or seized the imitation insects, yellow scored 41; blue, 22; purple, 15; green, 13; red, 9. Another drake without this complex as to red was tested. Much of its food showed red, orange, yellow and green colors, but from blues and purples it was protected. Of the first hundred strikes at the same colors, red received 31, and purple came next with 23, then blue, 17; yellow, 15; green, 14. In a second test with the same drake, purple came highest with 29, then red, 22; yellow, 21; blue, 17; green, 11. The drake that had feared red and orange, grouped purple, green and red as lows; the drake that had not, grouped together as highs red and purple, and left yellow and blue almost tying for second lowest with green.

Three other ducks have proved too nervous for experiment. All, however, react to the band of the spectrum, and seem to prefer the red end, nibbling at it curiously with the beak until its non-edible nature is fully impressed upon their psychology. Green is more neglected, perhaps an association that comes from being reared on a lawn. Other such associations are indicated: a drake after feeding on watermelon attempted to pick a painted rose off the surface of a bowl, while his mate after feeding on tomatoes reached up to pluck at a similarly colored Zinnia on the very tip of its stalk.

The ducks used in these experiments were the white Pekin variety of the domestic Mallard. The similarity of color reaction between representatives of such widely separated habit groups is noteworthy, but would not justify our concluding, for example, that the decorative objects selected by a Bower-bird would show a similar color relation. At least, it seems, there is offered here a field for additional experiment.

Let us graphically illustrate by initials the relation of the major colors as seen on the pigment wheel:

R
P O
B Y
G

Primitive forms of nearly all higher animal classes tend to assume gray, black, white, and brown colors. As development continues, assisted perhaps by environments of the blue-green of the sea and the greens of vegetation, there seems a tendency to assume colors from the lower half of the circle. Progress from here is often striking, and seniority appears to figure in the appearance of succeeding

colors. In beak and feet colors, bluish appears even in our Pied-billed Grebe (*Podilymbus podiceps*). With some weakness at green the next order carries us through yellow, orange and red, but the gap at purple is inadequately filled by the purplish-red of the feet of certain geese. Plumage starting in the blue-kin are advances in both directions. Even such high forms as the duck family affords seem limited to purple, blue, and green, save in badly toned down shades as in the so-called "red" of the Wood Duck (*Aix sponsa*). The flamingos and ibises attain red, and yellow lingers as a mere wash until found in the plovers. The orange gap is hardly filled before we reach true land birds. Our wood warblers, strong in yellow-greens, are weak at the purple gap; woodpeckers strong in red and yellow break down at blue and purple; our finches with brilliant reds, purples, blues, greens and yellows, break at orange. The orioles, with the brilliant Baltimore's orange, prophesy weakness for their group among blues and purples, and so on.

Let us take a whole family, found exclusively in the New World. The hummingbirds apparently followed the rule and developed from neutral browns, grays, whites and blacks a protectively green-colored type. Display plumage, striated and pigmented, developed. From available descriptions of the display plumage, it appears that 192 species show green in a form more or less ornamental rather than merely protective; 112 show blue, 60 purple, 82 red, 9 orange and 4 yellow. The graduated drop from green to purple may indicate the order of development. A rise at red would be expected from natural selection and red's general attraction, after which the decline is resumed. Thus these flower-loving birds trace a graph on our wheel backward to that of flowers which came from green, through yellow and red, to purple and are only now bridging the gap at blue, the mixture of blue and green found in certain feathers of the peacock being still unattained in the flowering plants. Certain flowers, in defiance of DeCandolle's xanthic and cyanic classification show blues and yellows grouped together. Can there be an undiscovered line of grouping through the green across this unbridged gap?

Seniority of color development, the building of tone on related tone, would explain many of the puzzling color harmonies we marvel at in nature. If such works naturally in jewels in the rough, why not in plumage? As to the designs formed, that is another problem; even Darwin confessed to worrying himself sick over the feather of a peacock. Nature working to evolve protective, yet ornamental colors near the bottom and left of our wheel seems to meet an aggressive force, that develops from those bottom colors, step by step, the more showy colors near the top and right.

Dr. J. C. Lewis in "Some Considerations on Sight in Birds" (Emu, 15, 1916, p. 224) notes briefly some objection to the Young-Helmholtz theory that the color vision of birds is limited to red and green, or combinations of these. The present experiments indicate that some birds at least see colors also in relation to red and green. Grant, then, a mating selection by a red-loving female, ultramarine would be preferred to blue, and purple to ultramarine, though both might be seen by the bird as varying shades of red because of the red pigment contained. Fortunately the females of many species have ever been willing to lower their high ideals and desires to meet and accept the poor approximations that were available. The color ideal of many birds seems to lead to colors that contrast with the ubiquitous green.

Greenville, South Carolina, July 29, 1935.

NOTES ON THE FORMS OF SPIZELLA ATROGULARIS

By A. J. VAN ROSSEM

Among the bird types which it was my privilege to examine when at the University Museum in Berlin in August, 1933, was Cabanis' type of *Spinites atrogularis*. It is an adult in abraded plumage, as though taken in late summer or early fall before the molt and, though not marked as to sex, is obviously a male. Like most of the older types in the Berlin institution it is mounted and is in very fair condition. Data on the side of the stand (aside from the type tag) are rather meager: "F. atrogularis n [obis] | Emberiza Shattucki Audub.? | Mexico 6141 Aschenborn." The name unquestionably originated with Lichtenstein, though I can find no trace of it in Lichtenstein's works, even as a *nomen nudum*. Since Aschenborn is known to have collected in the vicinity of Mexico City, it is likely that the locality given refers, specifically, to that place rather than to the country as a whole.

Even though no comparative material was available at the time, the type was at once recognized as a "new" bird in my experience. The general coloration was dark, the back distinctly reddish brown, the chin patch velvety black and more extensive than in northern birds, and, as a very distinct feature, the anterior part of the face including the lores was black, concolor with the chin. Careful notes for future reference were made at the time of examination.

Thanks to the Bureau of Biological Survey, the Dickey collection at the California Institute of Technology, the Alden Miller collection, the Museum of Vetebrate Zoology, and the United States National Museum, I have been able to assemble a fairly representative series which, combined with the adequate Lower California and southern California material in the collection of the San Diego Society of Natural History, shows that there are certain racial variations which should be awarded recognition.

Nine specimens in the Biological Survey collection from the southern plateau states of Tlaxcala, Hidalgo, Jalisco, Puebla, and Michoacan agree in characters with the type of *Spinites atrogularis*. They are all relatively dark, richly colored birds with distinctly reddish backs and, in fresh plumage, with the underparts and wings washed with brown. Couch's type of *Struthus atrimentalis* (no. 4335, U. S. Nat. Mus.) from Agua Nueva in extreme southern Coahuila has been examined and found to be of this same race, though Couch's mention of the black lores and narrow frontal line made such examination scarcely necessary.

Eleven specimens from Paradise on the eastern side of the Chiricahua Mountains, Arizona (very close to the New Mexico line), Fort Whipple, Arizona, the Charleston Mountains in southern Nevada, the Providence Mountains in extreme southeastern California, and Oposura, Sonora, differ from the southern Mexico birds in their definitely paler and grayer general coloration, more sandy or clay-colored backs and, in adult summer males, more restricted and distinctly grayish black chin patch and gray or slaty (not velvety black) lores. Size in these two races is very similar, though the bills of the northern birds seem to be a little larger.

As a name for this northern race it appears to me, in spite of the comment by Ridgway (Birds N. and Mid. Amer., 1, 1901, p. 323, footnote), that *Spizella evura* Coues is valid. This name is accompanied by a bibliographic reference to specimens described (in the Ibis, 1865, p. 118) and hence is certainly *not* a *nomen*

nudum; furthermore an additional line of description is appended to the name on its first appearance. I may add that Dr. H. C. Oberholser and Mr. J. L. Peters concur as to the availability of this name. The United States National Museum has kindly forwarded for examination the specimen which Ridgway (*op. cit.*, p. 324) has (inferentially) designated as the type. It is no. 83567 U. S. Nat. Mus., a young bird of unknown sex, changing from juvenal to postjuvenal plumage, collected at Fort Whipple, Arizona, on August 10, 1864, by Dr. Elliot Coues. The original field tag is missing, although the writing on the Ridgway collection tag, which is now attached, appears to be that of Dr. Coues. On the reverse appears, in the same handwriting: "Typical of *'evura'* Coues." Whether this specimen can be considered a holotype appears doubtful, since Coues himself did not designate one and certainly had several specimens at the time his brief comments (Ibis, 1865, p. 118, and Proc. Acad. Nat. Sci. Phila., 1866, p. 87) were made. At any rate it is certainly a cotype.

Spizella atrogularis cana of southern California and northern Lower California is currently recognized. Its status has been adequately discussed by Grinnell and Swarth (Auk, 43, 1926, pp. 475-478) and there is no need for further detailed remarks here. Briefly, it is a small race with a slightly darker and less purely gray coloration as compared with *evura*. The characters are most pronounced southerly. From Ventura County northward there are slight but definite tendencies toward *caurina* of the San Francisco Bay region.

Not only are the Black-chinned Sparrows from the San Francisco Bay region larger than *cana* (almost as large as *atrogularis* and *evura*) but they possess a distinctly darker and grayer coloration. In depth of color they approximate *atrogularis*, but the tones are gray or slaty, not brownish gray, the back is not nearly so reddish as in *atrogularis* and the lores and chin patch, while darker than in *cana* and *evura*, are slaty or slaty black, not velvety black as in *atrogularis*. I have examined the type and the type series (7 specimens), and have no reason to suspect that "sooting" is responsible for the dark coloration. Contributory evidence that the darkness is *not* of an adventitious nature is shown by the Mount Pinos series which shows a slight approach to the bay birds in color. *Spizella atrogularis caurina* appears to be an easily distinguishable subspecies.

To summarize briefly the foregoing remarks: there appear to be four principal geographic variations of the species *Spizella atrogularis*. Their nomenclature, and their ranges in so far as it is now possible to determine them, are as follows:

Spizella atrogularis caurina A. H. Miller

Spizella atrogularis caurina Miller, Condor, 31, No. 5, September 16, 1929, p. 206 (Las Trampas Peak, Contra Costa County, California).

Range.—Coast range foothills of Contra Costa and Alameda counties, California. Winter home unknown.

Spizella atrogularis cana Coues

Spizella cana Coues, Proc. Acad. Nat. Sci. Phila. [18] 1866, No. 1, January-March, [June 11], p. 88 (Cape San Lucas [Lower California]).

Range.—Foothills of California from Monterey and Inyo counties south to about Lat. 30° N. in Lower California. Winter range from Los Angeles County south to Cape San Lucas.

Spizella atrogularis evura Coues

Spizella evura Coues, Proc. Acad. Nat. Sci. Phila., [18], 1866, No. 1, January-March, [June 11], p. 87 (Fort Whipple, Arizona).

Range.—Upper Sonoran zones of extreme southern Nevada, southeastern California, southern Arizona, and southwestern New Mexico, south to east central Sonora. Winter range unknown, but probably in northwestern Mexico.

Spizella atrogularis atrogularis Cabanis

Spinites atrogularis Cabanis, Mus. Hein., 1, sig. 17, April [Oct.?], 1851, p. 133, footnote (Mexico[Mexico, D. F.]).

Struthus atrimentalis Couch, Proc. Acad. Nat. Sci. Phila., [7] "April," 1854, p. 67 (Agua Nueva, Coahuila).

Range.—Southern portions of Mexican plateau, north to southern Coahuila. Apparently resident.

MEASUREMENTS OF MALES IN MILLIMETERS

		Wing	Tail
4	*caurina*	64-65	66-68
3	*cana* (Ventura County)	61-64	62-67
7	*cana* (southern California)	60-63	62-64
8	*cana* (Lower California)	60-63	61-65
6	*evura*	64-67	68-74
5	*atrogularis*	63-68	67-74

San Diego Society of Natural History, Balboa Park, San Diego, California, August 5, 1935.

FROM FIELD AND STUDY

A Food Habit of the English Sparrow.—Early on the morning of June 1 an interesting and to me unusual food habit of the English Sparrow (*Passer domesticus*) was observed. Harry Logan, Customs Inspector, called my attention to a nest of ants he had uncovered while cleaning up a pile of trash, before going off duty. The nest was located under a half page of newspaper which had fallen directly under the International fence. A large quantity of eggs had been laid on top of the concrete pavement and under the paper. The ant adults, a large, dark, reddish species, were thickly clustered around and on the eggs.

While I was discussing this phenomenon, an adult male English Sparrow appeared and took cognizance of the situation. He began circling the exposed nest and started robbing the ants, which by this time were carrying their eggs to a safer place. Seizing an egg the bird would, with a shake of the head, disengage the attendant ant. He was soon joined in the sport by a female. Gathering a mouthful of eggs each would leave for its respective nest. Apparently they were from two different nests, located approximately 150 yards away.

After several trips the ants were fairly well scattered, and the male sparrow began hopping into the midst of the crawling mass. He would just about gather a mouthful of eggs when he would be obliged to take time out to free himself of clinging ants. Sometimes a fluttering hop would do it. Sometimes he would have to pull them loose. Several times he was noticed leaning back on his tail and bracing himself with one leg, as he vigorously pulled an enterprising ant loose from the upper part of the other leg. The female did not brave the dangers of the middle of the nest until the ants were so scattered as to make the dangers negligible. Once she was noted having a struggle with an ant in her mouth, which she loosened with a toe of the left foot. When an ant with a pair of extra strong jaws got a strong hold, a weak, plaintive note was heard accompanied by a fluttering hop. A strand of barbed wire an inch or two above the concrete and traversing the diameter of the nest furnished an excellent sniping post for the two birds, now joined by a third male sparrow from Mexico. The three effectively robbed the nest of a majority of the

eggs estimated to number approximately one thousand.—UHL R. KUHN, *Nogales, Arizona, July 8, 1935.*

Nine New Birds from Williams, Arizona.—Apparently the only published records of birds from the vicinity of Williams, Coconino County, Arizona, are in two papers by Dr. A. Wetmore (Kansas Univ. Sci. Bull., 4, 1908, pp. 377-388; Condor, 23, 1921, pp. 60-64) and in one by W. B. Mershon (Condor, 21, 1919, p. 126).

On February 10, 1934, I visited Williams. In company with Mr. C. M. Armack a trip was made the next morning through the Transition Zone to a point five miles south of town. In the afternoon of the same day, accompanied by Mr. and Mrs. John Bedford, observations were made two miles north of town in the Upper Sonoran Zone. In addition to my personal notes, Mr. Bedford has contributed from his notebook. Twelve specimens taken are in the collection of the Museum of Northern Arizona.

To Wetmore's list of 65 species (1921, p. 60) are added *Cygnus columbianus* (Mershon, *loc. cit.*) and the following nine, making a total of 75 species recorded from the vicinity of Williams, Arizona.

Meleagris gallopavo merriami. Merriam Turkey. Although not seen by me, turkeys are quite common in the forest near Williams where a large number are killed each season by local hunters.

Porzana carolina. Sora. Regarding this species Dr. A. Wetmore, under date of April 4, 1933, has written me the following: "Between June 28 and July 1, 1907, I found several nests of this bird at Rollins Lake, near Williams, Arizona. The water level in the lake had receded recently, leaving the nests high and dry, which circumstance probably accounts for the fact that the rails had left them. I examined this area in the summer of 1918, but found that grazing had destroyed all cover and that there were no trails of rails at that time."

Oxyechus vociferus. Killdeer. I saw a single individual at a pool beside the highway about seven miles east of Williams on the morning of February 10. This appears to be the earliest date of record for the plateau.

Columba fasciata. Band-tailed Pigeon. Bedford reports a nest with one egg found on September 10, 1932, at Summit Springs, ten miles south of Williams. The nest, about eight feet above the ground, was in an oak tree in pine-oak association. When visited again two weeks later the nest was empty. On October 4, 1931, in the same locality, several hundred pigeons were seen feeding on acorns.

Speotyto cunicularia hypugaea. Western Burrowing Owl. Bedford reports seeing this bird on several occasions near Howard Lake about twenty miles north of Williams.

Megaceryle alcyon caurina. Western Belted Kingfisher. A single bird was seen by Bedford at Saganaw Dam, just south of Williams, in late summer, 1924. On September 4, 1932, a kingfisher caught a goldfish from a small pond in the lawn only a few yards from the Bedford house. An individual was also seen at the same pond about a week later.

Corvus brachyrhynchos hesperis. Western Crow. Bedford told me that on about the first of February, 1934, a flock of nine crows sat for some time in the top of a tree at his home. On February 11 of the same year I saw several and heard others about two miles south of town. On September 4, 1932, Bedford shot one at a small tank just north of Williams. Although noted in spring and fall near Flagstaff, there are relatively few published records for the State.

Mimus polyglottos leucopterus. Western Mockingbird. Although frequently seen in the Upper Sonoran Zone 18 miles north of Williams, Mr. Bedford says he has seen this species only once in the Transition Zone, south of Williams, July, 1933, elevation 7000 feet.

Myadestes townsendi. Townsend Solitaire. Fairly common on February 11 in juniper woods two miles north of town.—LYNDON L. HARGRAVE, *Museum of Northern Arizona, Flagstaff, April 22, 1935.*

A Cackling Goose Record for Lower California, Mexico.—According to Grinnell's "Distributional Summation of the Ornithology of Lower California" (Univ. Calif. Publ. Zool., 32, 1928, p. 78), records of collected specimens of the forms of *Branta canadensis* from Lower California are few. It therefore seems worth while to record the capture, on November 3, 1934, of a specimen of *Branta canadensis minima* at

Santa María, near San Quintín, Lower California, Mexico. The bird was killed by L. E. Black and presented, in the flesh, to the San Diego Society of Natural History, where it has been added to the scientific collection. So thoroughly had Mr. Black eviscerated the bird that it was impossible to determine its sex.—LAURENCE M. HUEY, *San Diego Society of Natural History, Balboa Park, San Diego, California, June 17, 1935.*

The Common Loon in Nevada.—From the Nevada shore at least six loons were seen, April 19, 1935, on Lake Tahoe. A few days before, only one or two birds had been noted at the same place. The birds were closely watched with glasses, and as one came within a few yards of the beach details were seen quite clearly. The head and neck were entirely black, except for a few white marks near the throat. No gray or whitish areas could be seen either on the back of the head or neck. The back was black spotted with white, and the breast was white. Thus it would seem the bird was a Common Loon (*Gavia immer*).—ARCHIBALD JOHNSON, *Stewart, Nevada, June 10, 1935.*

Western Tanager Nesting in Alum Rock Park, San Jose.—For some years there has been a suspicion in the minds of local bird students that the Western Tanager (*Piranga ludoviciana*) was nesting in Alum Rock Park. This park is six miles east of San Jose, California, in the Mount Hamilton Range. It was my good fortune to locate a nest of this species there during the past season.

The tanagers were first observed on June 2, a pair feeding in a densely wooded area above the bath house. They were seen again on the 8th, moving around the grove. By the 14th they had restricted their activity to a small glade just off the exit road at an altitude of 900 feet.

The nest was first definitely located on June 15. Only the male was hunting, moving rapidly through the brush and making frequent trips to the nest. A tall live oak held the nest, situated at the tip of a thin limb and surrounded by leaves. The nest was inaccessible and remained undisturbed. On June 16 the male and female were observed feeding together, close to the nest. A neighboring pair of Wood Peewees brought off their young on June 21 and it was noted that the male tanager gave the alarm note constantly while feeding near this family. The young were still in the nest on June 22, and the male was singing between feeding trips. It was especially noted on this date that the female was foraging with the male. Next day the pair was again seen carrying food to the youngsters, both making frequent trips. The parents were last seen about the nest on June 28, at which time only the female actually visited the nest. On the following day the birds were gone from the vicinity and the nest was found to be empty. They were not seen again in the park.—JAMES PETERSON, *Santa Clara, California, August 6, 1935.*

Additional Notes on Snow Buntings Perching in Trees.—In the *Condor* for May (37, 1935, pp. 174-175), Laurence B. Potter writes of observing Snow Buntings (*Plectrophenax nivalis*) perching in a cluster of willows. He mentions this as being the first time he had ever seen any Snow Buntings alight in trees; he also mentions others who have had the same experience.

Here near McMillan, Luce County, Michigan, it is a very common sight to see a flock of these birds on one or more of the apple trees during the months that they frequent my trapping station which is within a few feet of the orchard. To see a flock of these birds in a tree makes it appear as if it were in bloom. I have seen Snow Buntings at times alight in trees in the late fall after they had arrived from their nesting grounds in the far north and before winter had set in to cover their natural feeding grounds. At such times they very seldom come to my feeding stations. Upon the arrival of spring, as bare ground and some patches of weeds become uncovered, they begin to quit the feeding stations. They then gather in large flocks and are seen on trees at the edges of the woods, chirping and singing so vigorously that at close range scarcely anything else can be heard.

Potter also states that he has never seen a longspur alight in a tree. I have seen Lapland Longspurs (*Calcarius l. lapponicus*) alight in trees many times, chiefly

in spring and often with Snow Buntings. As to Horned Larks (*Otocoris alpestris*), I have never seem them in trees that I can recall; my experience therefore is similar to Mr. Potter's in this regard. He also mentions the pipit family as having very little use for a tree, with which I agree. During my years of observing and keeping records of birds, I have two records of the American Pipit (*Anthus spinoletta rubescens*) in trees. These are: September 22, 1929, a few on an outer dead branch of a black cherry tree in a field; September 19, 1931, one on the top of a balsam fir in a field. Both of these observations of the pipit in trees were made about two miles due south of McMillan. The birds were not more than twenty-five feet, nor less than fifteen feet, from the ground.—OSCAR MCKINLEY BYRENS, *McMillan, Luce County, Michigan, July 27, 1935.*

Long-billed Dowitcher Breeding in Alaska.—Breeding records for the Long-billed Dowitcher (*Limnodromus griseus scolopaceus*) seem to be sufficiently scarce to make the following two sets of eggs worth recording. These are: no. 3605 in my collection, July 1, 1929, Wales, Alaska, four eggs collected by a native together with nest material and sent directly to me; and no. 5435, June 15, 1934, Meade River, Northern Alaska, four fresh eggs of the brown type, nest material, and parent bird, sent to me by Charles D. Brower.—WILSON C. HANNA, *Colton, California, September 9, 1935.*

Nesting of the Yellow-breasted Chat in Saskatchewan.—The Yellow-breasted Chat (*Icteria virens*) was first recorded in Saskatchewan by Taverner (Auk, 44, 1927, p. 227), some twenty-five miles west of this point (Eastend). Since that date, June 4, 1921, the bird has been noted frequently by the writer and other residents of this section of the Province. On June 21, 1935, I was trying to stalk a chat in some thick brush and by good luck flushed a sitting female from her nest. This nest was placed in a gooseberry bush two feet from the ground and contained one egg. The chat is said to desert its nest on very small provocation, so I left the spot at once and did not return until eight days later. On this occasion I was accompanied by two naturalist friends, Mr. Chas. F. Holmes and his son Paul. This time the nest contained four eggs, three of the chat, and one of the cowbird. We collected the female bird, but her mate, as usual, was adept at concealing himself, the while scolding us from close-by. The eggs, when blown, proved to be well incubated, an interesting point, for the chat is generally supposed to desert its nest at once rather than be victimized by the cowbird.

So far as can be ascertained, this is the first recorded nesting of the Yellow-breasted Chat anywhere in the three prairie provinces.—LAURENCE B. POTTER, *Gower Ranch, Eastend, Saskatchewan, Canada, August 16, 1935.*

Wood Ibis near Death Valley.—On the afternoon of July 8, 1935, I watched three Wood Ibis (*Mycteria americana*) at a distance of less than seventy-five feet as they waded in the shallow water of Saratoga Springs. These springs give rise to a reed-filled, fresh water lake a couple of acres in extent, well stocked with a native fresh water perch. They are located on the road from Baker to Death Valley, California, about eight miles south of the Inyo-San Bernardino County line at an elevation of 215 feet. A local resident told me that the birds had been seen there several times during the last few weeks.—J. R. PEMBERTON, *Altadena, July 10, 1935.*

Second Record for the Brewster Booby on the West Coast of Lower California.—On August 12, 1935, Captain J. R. Moore, commercial fisherman, brought to the San Diego Natural History Museum a living Brewster Booby (*Sula brewsteri*). The bird was captured early that morning when it came aboard a fishing boat about twelve miles south of Los Coronados Islands, Lower California, Mexico. The capture brings the occurrence of this species within fifteen miles of California waters and constitutes the second record for the Brewster Booby on the western side of the peninsula of Lower California (Huey, Condor, 26, 1924, p. 74). This bird, an immature female, was hatched during early spring of the current year and is

another example of a young bird wandering far from its normal range.—LAURENCE M. HUEY, *San Diego Society of Natural History, Balboa Park, San Diego, California, August 27, 1935.*

The Vocal Apparatus of the Elf Owl and Spotted Screech Owl.—In an earlier paper (Condor, 36, 1934, pp. 204-213) on the vocal equipment of North American owls I was unable to consider that extreme pygmy of the bubonid tribe, the Elf Owl (*Micropallas whitneyi*). Through the efforts of Loye Miller, examination of two syringes of male Elf Owls and correlation with the pitch of their hoots are now possible. As expected, the syrinx is extremely small, but it fits into the series of owls previously studied as a terminal member. The measurements with those of the Pygmy Owl, *Glaucidium gnoma*, in parentheses for comparison are: length of vibrating membrane, 3.1-3.2 mm. (3.6-3.9); length of membrane as per cent of bronchial diameter, 200-206 (205-211); bronchial diameter 1.5-1.6 mm. (1.8-1.9); tracheal diameter, 2.1 mm. (2.5-3.0).

The pitch of an Elf Owl's hoot or whistle is E^2 flat to E^2 natural. This is two octaves and a little more above the hoot of male Horned Owls (D). The inverse proportion between membrane length and pitch has been used in computing the theoretical vibration rate of the Elf Owl. The ratio of the membrane to vibration rate in the male Horned Owl was taken as the norm. The computed rate for the Elf Owl is 1158.5 or about D^2 natural of the tempered scale which, it will be noted, departs from observations by only half a tone. Thus over the extreme range of size in the owls, structures and notes produced are well correlated. The dependence of hoot on diameter of air passages and this in turn on size of the bird is further borne out (see p. 212, *op. cit.*).

The muscle attachments of the Elf Owl syrinx are on the seventh bronchial semiring on both sides. This arrangement is not unlike that in other small owls. There is no asymmetry as in *Glaucidium* and *Strix*.

The syrinx of a male Spotted Screech Owl (*Otus trichopsis*) has the insertion of the intrinsic muscles on the eighth right bronchial ring and the seventh left ring, identical with one asymmetrical *Otus asio* already reported. The measurements are: length of vibrating membrane, 4.4 mm.; length as per cent of bronchial diameter, 209; bronchial diameter, 2.1 mm.; tracheal diameter, 3.6 mm. Compared with males of the small race *gilmani* of *Otus asio*, these are but slightly smaller. No important difference in pitch should result. Loye Miller reports that he observed no higher pitch in *trichopsis*. The special characteristic of the Spotted Screech Owl's note is its rhythm, which of course is a matter of nervous control.—ALDEN H. MILLER, *Museum of Vertebrate Zoology, Berkeley, California, August 6, 1935.*

Pigmy Nuthatch in Berkeley.—On August 6, 1935 and frequently thereafter, one or two Pigmy Nuthatches, *Sitta pygmaea pygmaea*, were heard or seen in a region lying between Professor Sidney Mitchell's garden on Woodmont Avenue in Contra Costa County, and Grizzly Peak Boulevard in Berkeley (Alameda County) just south of this. They appeared to be immature birds of the current season. They fed mainly in Monterey pines, but also in eucalyptus woods and on brooms (*Genista* sp.) which were infested with aphids and overrun by ants and lady-beetles. After August 26 only one individual was seen at a time; it was last seen on September 8. The writer was already thoroughly familiar with this species as seen near Monterey. Ample opportunity was had for indubitable identification, fortified by reference to specimens in the Museum of Vertebrate Zoology of the University of California.—S. C. BROOKS, *Berkeley, California, September 18, 1935.*

Flickers and Jays Feeding on Scarab Beetles in Flight.—*Pleocoma behrensi* is a species of scarab beetle occurring in the foothills of the San Francisco Bay region in California. It is a fairly large insect, females measuring about one and one-fourth inches long by three-fourths of an inch wide, and males about one inch long by half an inch wide. The host plant is *Baccharis pilularis*, commonly known as coyote brush, a predominant shrub of the chaparral in this region. In the fall, during or just after, the first rains, the adults of *P. behrensi* emerge from the ground. The females, being flightless, remain within their open burrows, usually near the surface

of the ground. At dusk, or in the daytime when it is raining, the nuptial flight of the males begins. The species is crepuscular, and thus the flight only occurs in dim light as just before dawn, at dusk, or during a shower, and lasts but two or three days each fall.

In the afternoons of October 14 and 15, 1935, Mr. M. A. Cazier, Mr. F. R. Platt, and I visited Strawberry Canyon, east of the University of California Campus, Berkeley, to collect specimens of this species of scarab. While waiting on a hillside for the flight to begin, I observed several Red-shafted Flickers (*Colaptes cafer collaris*), Coast Jays (*Cyanocitta stelleri carbonacea*), and California Jays (*Aphelocoma c. oocleptica*) perched on the branches of a number of dead eucalyptus trees near-by, facing the setting sun. As soon as the sun disappeared behind Marin Point, across the bay, the pleocoma flight began. Here and there, flying low over the tops of the chaparral shrubs we could observe individual male scarabs. Just as I started after a specimen, one of the California Jays swooped down the canyon and, following the erratic flight of the beetle, snatched it in mid-air and returned with it to one of the dead trees. Thereafter I observed several California Jays, two Coast Jays and three Red-shafted Flickers capture individual beetles in flycatcher fashion. In each case, the bird attained a position behind its intended victim, then, taking up the erratic zigzag course of the beetle, suddenly swooped down and captured it in mid-air. In relatively few instances did the birds miss their prey. After a capture had been made, each bird apparently returned to its original tree to eat its prize before starting in pursuit of another.—JACK C. VON BLOEKER, JR., *Museum of Vertebrate Zoology, University of California, Berkeley, October 17, 1935.*

NOTES AND NEWS

As this issue of the *Condor* goes to press, word comes of the death of Harry S. Swarth. No brief statement can appropriately express the loss of so eminent an ornithologist. His well known achievements in the study of birds and mammals on the Pacific Coast are perpetual testimony of his scientific and literary abilities. Intimate knowledge of birds from many sections of the West in which he explored and collected and from regions so far separated as the Galapagos Islands and Alaska enabled him to deal authoritatively with distribution and speciation in western North America. In the course of his professional career he had been associated with the Los Angeles Museum, the Museum of Vertebrate Zoology, and the California Academy of Sciences. These varied connections developed close acquaintances with many Club members. In both northern and southern divisions he was widely known and respected. Few people have played so large a part in the affairs of the Cooper Club. He gave generously in service through his 39 years of membership. From 1910 to 1927 he was associate editor of the *Condor*. But aside from these tangible things there stand in the memory of his associates the wit and subtle humor which he imparted to many hours of conversation and debate.—A. H. M.

Part VIII of Hellmayr's "Catalogue of Birds of the Americas" appeared September 16, 1935, making the second volume of this extensive work to be issued in less than a year. This part covers the Alaudidae, Hirundidae, Motacillidae, Bombycillidae, Ptilogonatidae, Dulidae, Vireonidae, Vireolaniidae, Cyclarhidae, Laniidae, Sturnidae, Coerebidae and Compsothlypidae. It follows the style of the previous volume (see review, Condor, 37, 1935, pp. 90-92). The rapid appearance of the sections of such a comprehensive work is a distinct advantage in that it makes for uniformity in style and viewpoint. It also means that earlier volumes will not become seriously antiquated before completion of the project.—A. H. M.

Fig. 54. Professor Charles T. Vorhies, University of Arizona, active leader and teacher of ornithology, and author of numerous articles on the natural history of southern Arizona.

The Fifty-third Stated Meeting of the American Ornithologists' Union, held at Toronto, October 21-24, 1935, proved to be the best attended of the three meetings of the Union so far held in Canada. A program of sixty-seven papers was presented. Mr. A. C. Bent was elected President; James P. Chapin was elected Second Vice-President; and Alfred O. Gross was added to the Council. Otherwise, the officers remain the same. One Fellow was elected, Mr. Edward A. Preble, of Washington, D. C. Seven Members were elected: James L. Baillie of Toronto; Albert R. Brand of White Plains, N. Y.; Walter J. Breckenridge of Minneapolis; Hildegarde Howard of Los Angeles; Aldo Leopold of Madison, Wisconsin; Roger T. Peterson of New York City; and Dayton Stoner of Albany. It was voted to hold the next annual meeting in Pittsburgh.—J. G.

The annual index for 1935 again has been prepared by Miss Selma Werner, who returns to this task after a year's absence in Europe. In 1934 Miss Margaret Wythe served in her stead. To these two Club members, generous of their time given in a tedious task, the editors are grateful. Likewise appreciative are those many users of the *Condor* who depend on the the index for references to species in which they are interested.

John W. Sugden, member of the Cooper Club since 1915 and a founder of the Intermountain Chapter died at his home in Salt Lake City, August 16, 1935, at the age of 68. Born in Doncaster, England, March 26, 1867, he came to Utah with his family two years later. As a pioneer naturalist in the State, his activities were remarkably varied. He was not a product of the schools and yet his interests were essentially intellectual. Around him grew up an enthusiastic circle of naturalists, chiefly entomologists and ornithologists. A woodworker by trade, he spent all time possible in the field. His extensive collections of insects and birds were kept with great care. Scarcely a day passed without some contact between him and other enthusiasts, and his home became a center for students of the region. Unwittingly he took on the role of a teacher and latterly was much in demand as a lecturer. To members of the Club not personally acquainted with him he is known through his beautifully illustrated articles on breeding birds of the Salt Lake area. Much lasting credit is due him for the inspiration and friendly interest he gave others in the pursuit and development of natural history in Utah.—A. D. Boyle and A. H. Miller.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

JULY.—The July meeting of the Northern Division of the Cooper Ornithological Club was held on July 25, 1935, at 8:00 p. m. in Room 2003, Life Sciences Building, Berkeley, with thirty-five members and guests present and President Miller in the Chair. Minutes of the Northern Division for June were read and approved. Minutes of the Southern Division for June were read. Charles Barrows Bennett, 1122 University Avenue, Berkeley, California, was proposed for membership in the Club by Jean M. Linsdale; and Miss Kathleen Dougan, 1829 Spruce Street, Berkeley, California, by

T. Eric Reynolds and Ernest I. Dyer.

"Summer field notes" were contributed by ten members of the Northern Division, some of them in such generous measure that it is not possible to give them adequate record in this brief resumé. In this division falls Mr. Wm. B. Davis' account of birds noted early this summer in the Snake River region of Idaho; these were compared in both numbers and species with birds as known there by the speaker fifteen years ago. Also here belongs Mr. D. D. McLean's report of a three weeks' trip up the inland route to Glacier National Park, on to Calgary, Jasper, Banff, Vancouver and home down the coast to San Francisco. In many places Mr. McLean's route lay through country where representatives of eastern and western species occur within a few miles of each other, or even show overlapping ranges.

Miss Barbara Blanchard told of two weeks spent visiting the coastwise hamlets of Humboldt County, where every little colony of White-crowned Sparrows had achieved individuality of song. Mr. Paul Covel reported upon a visit to Los Baños; Mr. Ben Gerwick upon birds seen in the Sierra Nevada between Reno and Bishop; Mr. Ted Malm upon two nests of the Townsend Solitaire on the middle fork of the Tuolumne River. Mr. Kinsey told so earnestly of his fruitless search for young Phainopeplas that he was deluged with helpful suggestions concerning good localities for these birds from Los Molinos to the Pinnacles. Mrs. Allen described a nest built by Water Ouzels upon a bridge support at the crossing of the Yuba River, the birds being apparently oblivious to the vibrations caused by autos passing overhead.

In his Piedmont garden this spring, Dr. T. Eric Reynolds put up a bird box for the inspection of a pair of Red-shafted Flickers. Since it did not meet with their approval he tried wiring a dead willow branch onto an oak tree, ten or fifteen feet above the ground. Here, within a week, the flickers began excavating, and in due course raised young. The bird box became the home of a pair of Screech Owls, and three young were raised. Ten days before the present meeting of the Club, Dr. Reynolds took over the care of two of the young owls. Bringing these juveniles to the meeting with him, they proved of much interest to the members. Lights were extinguished and an effort was made by means of a flashlight to observe the eye-shine of the birds. At best, this was faint; some said it was faintly ruby red, while some thought it had a coppery tinge.

Adjourned.—HILDA W. GRINNELL, *Secretary.*

AUGUST.—The regular meeting of the Northern Division of the Cooper Ornithological Club was held on August 22, 1935, at 8:00 p. m. in Room 2003, Life Sciences Building, Berkeley, with President Miller in the Chair and sixty-five members and guests present. Minutes of the Northern Division for July were read and approved. Minutes of the Southern Division for July were read. Mrs. Mary L. Courtright, 3 Elm Avenue, Larkspur, Calif., was proposed for membership in the Club by Mrs. Otis H. Smith, and Mr. C. L. Fretwell, No. 8, Elmhurst Apts., Ogden, Utah, by Mr. O. J. Murie.

Mr. Laidlaw Williams reported seeing a Sabine Gull at the mouth of the Salinas River on August 12; the bird's forked white tail was a conspicuous feature. Mr. Ernest I. Dyer told of a statement by Donald Brock that he had seen both Arizona Hooded and Bullock orioles along San Pablo Creek near Wildcat Canyon during the first week of August and that, on August 7, Western Tanagers also were seen in that vicinity. Mr. Kinsey described his most recent experiences in seeking, and finding, Phainopeplas along a dry arroyo near Livermore, he having been guided to the place by scouts from the Oakland Camp. The birds were not numerous, seeming to average about one pair per square mile; but according to one of the ranchers the species has been present in the locality for the past forty years. At this season the birds seemed to be feeding entirely on wild coffee berries (*Rhamnus californica*).

Mr. George Haley referred to a report on the flocking of Bald Eagles in Maine and said that this summer he had talked with Mr. Herbert McBride near Cherryfield, Maine. Mr. McBride showed him the preserved skin of a Bald Eagle which he said was one of a group of eighteen of the species counted at the carcass of a sheep in a near-by pasture. Mr. Alden Miller described the nest of a Purple Martin, found in a burned-out stub in Mendocino County. In the bottom of the nest-hole were pellets, insect remains and many clipped leaves of the California laurel (bay). The nest was so situated that these aromatic leaves could not have

reached the cavity save by being carried into it, and the question was raised as to whether the birds had in view the same idea which causes the housewife to put bay leaves into the nests of her sitting hens.

Mr. Miller also spoke of the elimination of baiting on duck ponds as a distinct achievement and said that conservationists should express their appreciation to the persons responsible for this apparently permanent move in the right direction.

The speaker of the evening was Mr. David Lack, of London, England, who told of his "Recent Observations on Territory in Bird Life." The theory of territory as given by Eliot Howard was discussed, and then Mr. Lack described his own experiences with the Great Crested Grebe, the English Robin, and hawks and buzzards of the British Isles, as well as the Red Bishop of the African grasslands. The warmest gratitude of the persons who were present is due Mr. Lack for his clear and entertaining exposition and also Mrs. Kenneth Saunders through whose interest the speaker's availability was learned.

Adjourned.—HILDA W. GRINNELL, *Secretary.*

SOUTHERN DIVISION

JULY—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at 8:00 p. m., Tuesday, July 30, 1935, at the Los Angeles Museum, Exposition Park, Los Angeles. Vice-president Little occupied the Chair, with fifty members and guests present.

The minutes of the Southern Division for June were read and approved. Minutes of the Northern Diviison for June were read by title only.

Some field observations were given by Mr. Reis covering a ten day period spent in the Mascot Lake country and in Mono Lake vicinity. Mr. Willett reported on birds he had noted on a trip into the Warner Mountain district and back via Sacramento Valley. American Egrets were found to be common in the rice fields of the valley. Mr. Sidney B. Peyton spoke of watching a Cooper Tanager feeding on bees. Mr. Glassell said he had seen a pair of Man-o'-war-birds at the head of the Gulf of California on June 19. This is, to his knowledge, the first occurrence of the birds in that region. Mr. Appleton told of a pair of Cardinals that had started to nest in a yard in Chatsworth, which is the northermost extension of their range yet reported from southern California. Mr. Lamb gave a short and interesting talk on the Roseate Spoonbill. He remarked on the great numbers of this bird formerly to be found on the coast of Florida, but believed there was no record for California and only one record for Lower California. The Roseate Spoonbill is found, however, in Sonora and from there south, but is not at all common in Sinaloa.

The program of the evening was given by Mr. James B. Dixon, of Escondido. Mr. Dixon brought with him several reels of motion picture film showing the "Predatory Birds of San Diego County" in their native haunts and nesting sites. While the film was being run he told of several field trips taken, of birds seen, and of birds photographed. The various pictured poses of juvenal eagles and hawks were extremely interesting, and those of the adult Spotted Owl were excellent. There was need of arduous labor to secure motion pictures of some of the nest occupants, and the Chair extended to Mr. Dixon the appreciation of the members of the Southern Division for the pleasurable privilege of being permitted to see the results achieved by his many hours afield.

As a visiting member from Washington, D. C., Dr. Harold C. Bryant was introduced and gave a short talk on his recent trip to the Chiricahua Mountains, and on the work that is being done by the National Park Service for the conservation of the wild life resources throughout the United States.

Adjourned.—LAURA B. LAW, *Secretary.*

AUGUST.—The August meeting of the Southern Division of the Cooper Ornithological Club was held at the Los Angeles Museum, Exposition Park, Los Angeles, on August 27, 1935, with fourteen members and guests present. In the absence of both the President and Vice-president, Mr. George Willett was chosen to occupy the Chair.

Minutes of the Southern Division for July were read, and with corrections noted, approved. Minutes of the Northern Division for July were read.

After a brief round table discussion of recent field observations, the meeting adjourned.—LAURA B. LAW, *Secretary.*

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